REMARKS

The present Amendment amends claims 1, 3 and 11-13, and leaves claims 2, 4-10, 14, and 15 unchanged. Therefore, the present application has pending claims 1-15.

Claim Objections

Claim 3 is objected to due to an informality noted by the Examiner. Amendments were made to claim 3 to correct the informality. Therefore, this objection is overcome and should be withdrawn.

35 U.S.C. §112 Rejections

Claim 1 is rejected under 35 U.S.C. §112, second paragraph as allegedly failing to particularly point out and distinctly claim subject matter which Applicants regard as the invention. This rejection is traversed for the following reasons. Applicants submits that claim 1, as now more clearly recited, is in compliance with the provisions of 35 U.S.C. §112.

35 U.S.C. §102 Rejections

Claims 1-15 are rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,977,927 to Bates et al. ("Bates"). This rejection is traversed for the following reasons. Applicants submit that the features of the present invention as now more clearly recited in claims 1-15 are not taught or suggested by Bates, whether taken individually or in combination any of the other references of record. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Amendments were made to the claims to more clearly describe features of the present invention. Specifically, amendments were made to the claims to more clearly recite that the present invention is directed to a network storage system for

supplying a storage to a plurality of clients and a network storage system connected to a network to which a plurality of clients are connected as recited, for example, in independent claims 1, 11 and 12.

The present invention, as recited in claim 1, and as similarly provided in claims 11 and 12, provides a network storage system for supplying a storage to a plurality of clients through a network. The system includes a first device and a second device. The first device is provided with a disk device, and the second device manages a connection to the clients. According to the present invention, the first device allocates an area of the disk device to the second device. Also, the second device allocates a portion of the area allocated from the first device to each of the plurality of clients. In addition, according to the present invention, the second device is provided with a means for translating a source network address to a specific network address of the second device, where the specific network address is transferred to the first device. In the present invention, the means for translating always translates each of a plurality of network addresses of each of the clients to the specific network address of the second device. The prior art does not disclose all of these features.

The above described features of the present invention, as now more clearly recited in the claims, are not taught or suggested by any of the references of record, particularly Bates, whether taken individually or in combination with any of the other references of record.

Bates teaches a method and system of allocating storage resources in a storage area network. However, there is no teaching or suggestion in Bates of the network storage system for supplying a storage to a plurality of clients or the network storage system connected to a network to which a plurality of clients are connected,

as recited in claim 1, and as similarly recited in claims 11 and 12 of the present invention.

Bates discloses a system for allocating storage resources in a storage area network. A logical unit number (LUN) mapper receives at least one storage request parameter and maps the storage request parameters to at least one physical LUN. The LUN mapper includes at least one LUN map. The storage request parameters include a host id parameter, a target LUN parameter, and a target host bus adaptor (HBA) parameter. The LUN mapper uses the host id parameter to select the one of the LUN maps that corresponds to the host id parameter. The LUN mapper applies the target LUN parameter and the target HBA parameter to the selected LUN map to locate the physical LUN(s) stored in the selected LUN map. The LUN mapper issues the received read/write storage request to at least one storage device that houses the physical LUN(s). The one or more storage devices are located in the storage area network.

One feature of the present invention, as recited in claim 1, and as similarly recited in claims 11 and 12, includes where the first device allocates an area of the disk device to the second device, and where the second device allocates a portion of the area allocated from the first device to each of the plurality of clients. Contrary to the Examiner's assertions, Bates does not disclose this feature. To support the assertion that Bates teaches this feature, the Examiner cites: column 4, lines 10-20; column 3, line 54 to column 4, line 5; and column 10, lines 5-20). However, neither the cited text nor any other portions of Bates teach or suggest the claimed features.

For example, column 4, lines 10-20 of Bates provides a description of Fig. 1, which illustrates a block diagram of an example storage allocator network configuration. As described, the storage 106 receives storage read/write requests

from the storage allocator 104. The storage 106 routes the received read and write requests to the corresponding storage device(s), which respond by reading or writing as requested. Storage 106 may comprise one or more of a variety of storage devices, including tape systems, JBODs (just a bunch of disks), floppy disk drives, etc. In the cited text, there is no teaching or suggestion of where the first device (storage allocator 104) allocates an area of the disk device (storage 106) to the second device (server 102), and where the second device allocates a portion of the area allocated by the first disk device to each of the plurality of clients, in the manner claimed. For instance, as shown in Fig. 2 of Bates, the allocation occurs solely in the storage allocator 104. As such, Bates does not teach or suggest where the second device (server 102) further allocates an area allocated by the first device, to each of the plurality of clients, in the manner claimed.

By way of further example, column 3, line 54 to column 4, line 5 of Bates also provides a description of Fig. 1, which illustrates a block diagram of a storage allocator network configuration. As described, the storage allocator 104 receives storage read and write requests from the server 102. The storage read and write requests include one or more locations in a logical data space recognized by the requesting host. The storage allocator 104 uses a parsed read and write request to determine physical storage locations corresponding to the target locations in the logical data space. One or more LUN (logical unit number) maps in storage allocator 104 are used to map virtual data locations to physical locations in storage 106. Storage allocator 104 outputs read and write requests to physical storage/LUNs. This is quite different from the present invention. More specifically, in Bates, there is no teaching or suggestion of where the first device (storage allocator 104) allocates an area of the disk device (storage 106) to the second device (server 102), and

where the second device allocates a portion of the area allocated by the first disk device to each of the plurality of clients, in the manner claimed. For instance, as shown in Fig. 2 of Bates, the allocation occurs solely in the storage allocator 104. Therefore, Bates does not teach or suggest where the second device (server 102) further allocates an area allocated by the first device, to each of the plurality of clients, in the manner claimed.

By way of even further example, column 10, lines 5-20 of Bates provides a description of Fig. 2, which illustrates a block diagram of a storage allocator. The cited text describes where a LUN mapper 206 of the storage allocator 104 receives the extracted parameters from read/write storage request parser 204. LUN mapper 206 stores LUN maps corresponding to servers and hosts. Available storage is partitioned in the LUN maps without any regard necessarily to the physical divisions of the storage devices. These partitions are referred to as virtual or target LUNs. Each host or server may be presented with different portions of physical storage via the LUN maps, or some hosts may have the same portions presented. Unlike the present invention, the cited text of Bates does not teach or suggest where the first device (storage allocator 104) allocates an area of the disk device (storage 106) to the second device (server 102), and where the second device allocates a portion of the area allocated by the first disk device to each of the plurality of clients, in the manner claimed. For instance, as shown in Fig. 2 of Bates, the allocation occurs solely in the storage allocator 104. Accordingly, Bates does not teach or suggest where the second device (server 102) further allocates an area allocated by the first device, to each of the plurality of clients, in the manner claimed.

Another feature of the present invention, as recited in claim 1, and as similarly recited in claim 11, includes where the second device is provided with a means for

translating a source network address to a specific network address of the second device, and where the means for translating always translates each of a plurality of network addresses of each of the clients to the specific network address of the second device. Bates does not disclose this feature. To support the assertion that Bates teaches a means for translating, the Examiner cites: column 11, lines 21-25 and column 11, lines 57-67. However, neither the cited text, nor any other portions of Bates, teach or suggest the claimed features.

For example, column 11, lines 21-25 of Bates provides a description of the LUN mapper 206 (Fig. 2) and the LUN map 308 (Fig. 3). As described, the LUN mapper 206 uses the received host ID parameter to determine which of the stored LUN maps to use. For example, LUN map 308 may be the proper LUN map corresponding to the received host ID. This feature of Bates is quite different from the present invention. For instance, there is no teaching or suggestion in the cited text of a means for translating a source network address to a specific network address of the second device, where the means for translating always translates each of a plurality of network addresses of each of the clients to the specific network address of the second device, in the manner claimed. More specifically, Bates does not teach or suggest translating a source network address, for each client, to the same network address of the second device, as claimed.

By way of further example, column 11, lines 57 to 67 of Bates provides a description of Fig. 5, which is an illustration of a storage area network. As described, host computers 502, 504 and 506 are servers on a communications network. Storage allocators 508 and 510 parse storage read and write requests received from host computers 502, 504 and 506, and use the parsed read and write requests to determine physical data locations in storage devices 512, 514, 516, and 518.

Storage devices 512, 514, 516, and 518 receive physical storage read and write requests from storage allocators 508 and 510, and respond by reading data from or writing data to storage as requested. This feature of Bates is quite different from the present invention. For instance, there is no teaching or suggestion in the cited text of a means for translating a source network address to a specific network address of the second device, where the means for translating always translates each of a plurality of network addresses of each of the clients to the specific network address of the second device, in the manner claimed. More specifically, Bates does not teach or suggest translating a source network address, for each client, to the same network address of the second device, as claimed.

Therefore, Bates fails to teach or suggest "wherein said first device allocates an area of said disk device to said second device" and "wherein said second device allocates a portion of said area allocated from said first device to each of said plurality of clients" as recited in claim 1, and as similarly recited in claims 11 and 12.

Furthermore, Bates fails to teach or suggest "wherein said second device is provided with means for translating a source network address to a specific network address of the second device, the specific network address to be transferred to said first device, such that the means for translating always translates each of a plurality of network addresses of each of said plurality of clients to the specific network address of the second device" as recited in claim 1, and as similarly recited in claim 11.

Therefore, Bates does not teach or suggest the features of the present invention, as recited in claims 1-15. Accordingly, reconsideration and withdrawal of the 35 U.S.C. §102(e) rejection of claims 1-15 as being anticipated by Bates are respectfully requested.

The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the references used in the rejection of claims 1-15.

In view of the foregoing amendments and remarks, Applicants submit that claims 1-15 are in condition for allowance. Accordingly, early allowance of claims 1-15 is respectfully requested.

To the extent necessary, the Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of Mattingly, Stanger, Malur & Brundidge, P.C., Deposit Account No. 50-1417 (referencing attorney docket no. H-1105).

Respectfully submitted,

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.

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Amendments to the Drawings

Amendments were made to Figs. 1 and 22 to correct the misspelling of "AMINSTRATION" to "ADMINISTRATION".

Amendments were made to Figs. 1, 8, 10, 12-14 and 22 to correct the misspelling of "TRANSRATION" to "TRANSLATION".

Marked-Up Drawings and Annotated Replacement Drawings are enclosed.

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FIG. 1

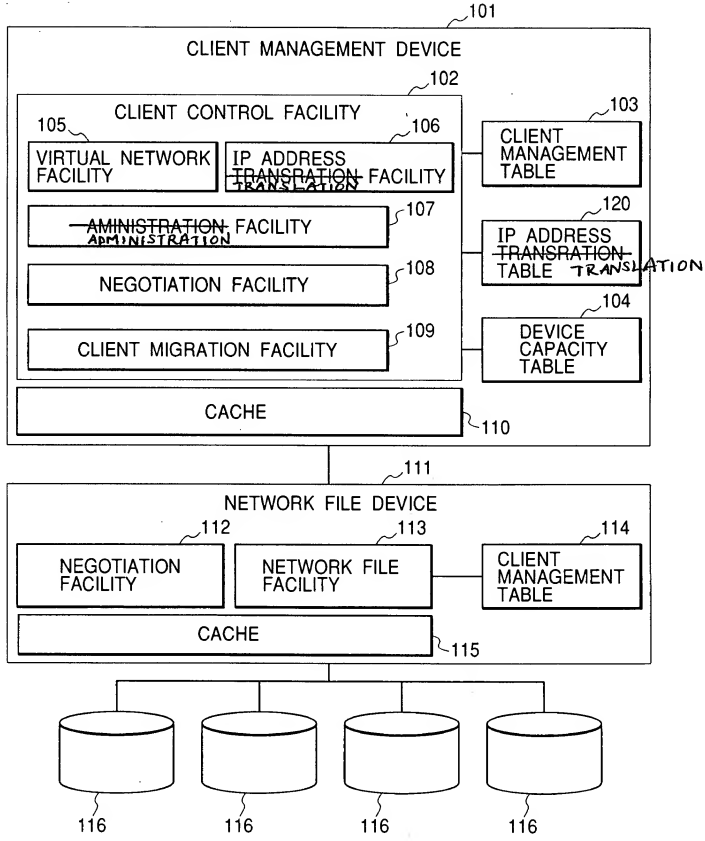


FIG. 8

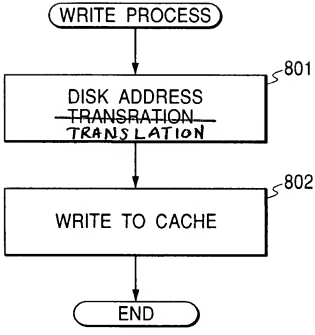

WRITE PROCESS
801
DISK ADDRESS
~~TRANSRATION~~
TRANSLATION
802
WRITE TO CACHE
END

FIG. 10

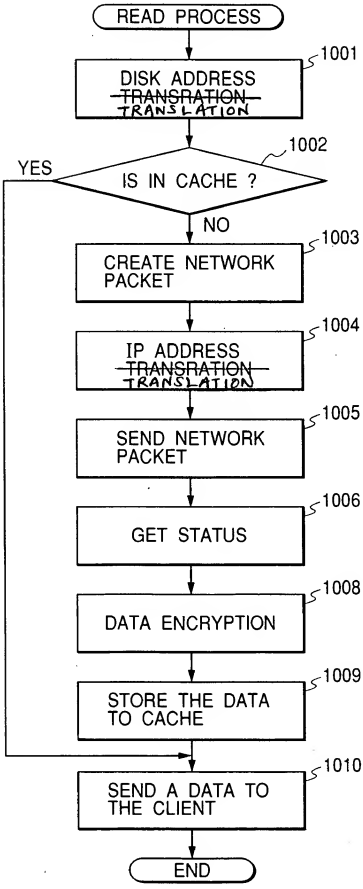

READ PROCESS
DISK ADDRESS TRANSRATION TRANSLATION
1001
IS IN CACHE ?
1002
YES
NO
CREATE NETWORK PACKET
1003
IP ADDRESS TRANSRATION TRANSLATION
1004
SEND NETWORK PACKET
1005
GET STATUS
1006
DATA ENCRYPTION
1008
STORE THE DATA TO CACHE
1009
SEND A DATA TO THE CLIENT
1010
END

FIG. 12

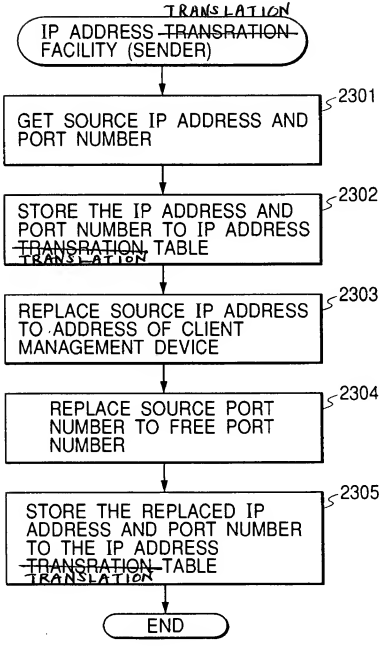

TRANSLATION
IP ADDRESS ~~TRANSRATION~~ FACILITY (SENDER)
2301
GET SOURCE IP ADDRESS AND PORT NUMBER
2302
STORE THE IP ADDRESS AND PORT NUMBER TO IP ADDRESS ~~TRANSRATION~~ TRANSLATION TABLE
2303
REPLACE SOURCE IP ADDRESS TO ADDRESS OF CLIENT MANAGEMENT DEVICE
2304
REPLACE SOURCE PORT NUMBER TO FREE PORT NUMBER
2305
STORE THE REPLACED IP ADDRESS AND PORT NUMBER TO THE IP ADDRESS ~~TRANSRATION~~ TRANSLATION TABLE
END

FIG. 13

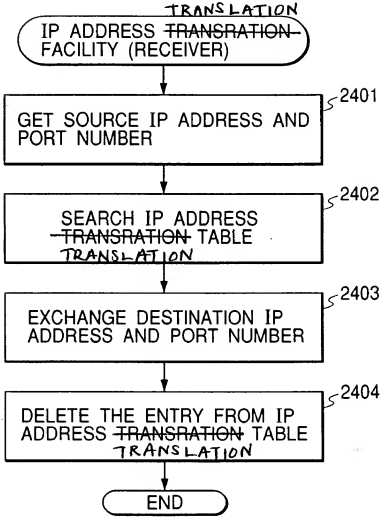

TRANSLATION
IP ADDRESS ~~TRANSRATION~~ FACILITY (RECEIVER)
2401
GET SOURCE IP ADDRESS AND PORT NUMBER
2402
SEARCH IP ADDRESS ~~TRANSRATION~~ TABLE TRANSLATION
2403
EXCHANGE DESTINATION IP ADDRESS AND PORT NUMBER
2404
DELETE THE ENTRY FROM IP ADDRESS ~~TRANSRATION~~ TABLE TRANSLATION
END

FIG. 14

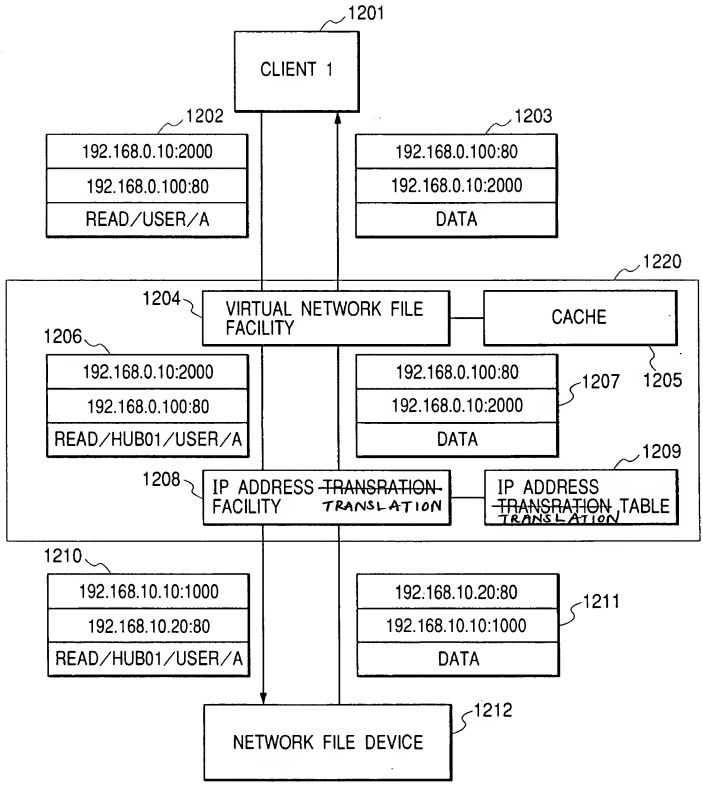
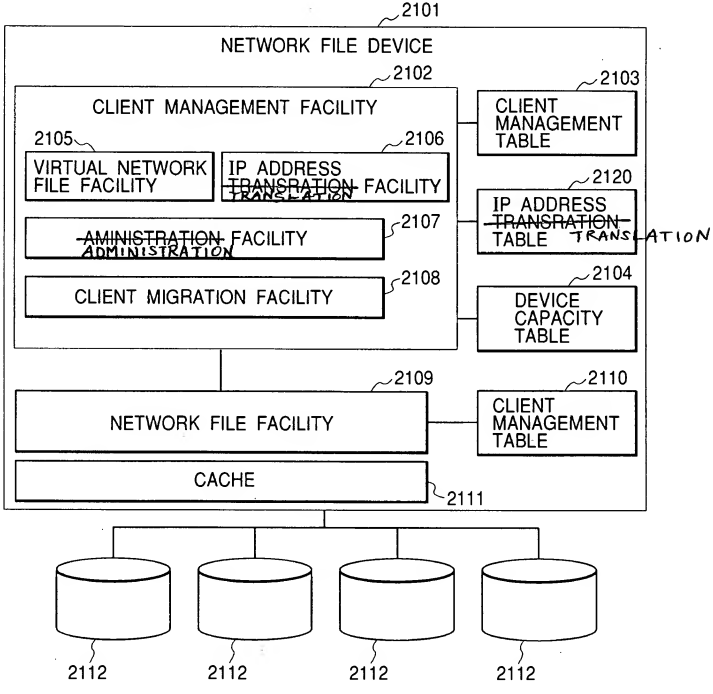

1201
CLIENT 1
1202
192.168.0.10:2000
192.168.0.100:80
READ/USER/A
1203
192.168.0.100:80
192.168.0.10:2000
DATA
1220
1204
VIRTUAL NETWORK FILE FACILITY
CACHE
1206
192.168.0.10:2000
192.168.0.100:80
READ/HUB01/USER/A
192.168.0.100:80
192.168.0.10:2000
DATA
1207
1205
1209
1208
IP ADDRESS ~~TRANSRATION~~ TRANSLATION FACILITY
IP ADDRESS ~~TRANSRATION~~ TRANSLATION TABLE
1210
192.168.10.10:1000
192.168.10.20:80
READ/HUB01/USER/A
192.168.10.20:80
192.168.10.10:1000
DATA
1211
1212
NETWORK FILE DEVICE

FIG. 22


2101
NETWORK FILE DEVICE
2102
CLIENT MANAGEMENT FACILITY
2103
CLIENT MANAGEMENT TABLE
2105
VIRTUAL NETWORK FILE FACILITY
2106
IP ADDRESS TRANSRATION FACILITY
2120
IP ADDRESS TRANSRATION TABLE
TRANSLATION
2107
ADMINISTRATION FACILITY
2108
CLIENT MIGRATION FACILITY
2104
DEVICE CAPACITY TABLE
2109
NETWORK FILE FACILITY
2110
CLIENT MANAGEMENT TABLE
CACHE
2111
2112
2112
2112
2112